Public Concerns Regarding the Proposed Crandon Mine & DNR Responses

A Summary of Public Comments and Questions
from the June 18, 1997
Public Meeting at **Tomahawk**, Wisconsin,
with DNR Responses

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Introduction

The Department of Natural Resources (DNR) wishes to thank all of the citizens who attended the June 18 public meeting at the Tomahawk High School. As was intended, the Department received many comments and questions during the meeting. Many of these questions raised issues that the DNR intends to analyze before publication of the Draft Environmental Impact Statement (DEIS).

Additional information is available in a number of recently updated mining information sheets available from the Department's Rhinelander (call Cathy Cleland at 715-365-8997) and Madison (call Shannon Fenner at 608-267-2770) offices. These are:*Potential Mining Development in Northern Wisconsin, The Cumulative Impacts of Mining Development in Northern Wisconsin, How a Mine is Permitted, Local Decisions in Mining Projects, Protecting Groundwater at Mining Sites, Reclamation and Long-term Care Requirements for Mine Sites in Wisconsin, How the Department of Natural Resources Regulates Mining, Addressing Public Concerns with Wisconsin's Laws Governing Mining,* and *Wisconsin's Net Proceeds Tax on Mining and Distribution of Funds to Municipalities*.

For a comprehensive description of how mining is regulated, refer to *An Overview of Metallic Mineral Regulation in Wisconsin*, by Thomas J. Evans, published by the Wisconsin Geological and Natural History Survey (WGNHS) as Special Report 13, 1996 (revised edition). The document is available from the WGNHS office in Madison (phone: 608-263-7389).

The following pages contain DNR responses to the questions and comments that arose at the public meeting. By reviewing the videotape of the meeting, the Department has made an effort to include each comment. In the instances that several individuals asked similar questions, an attempt was made to accurately capture the essential meaning in a single paraphrased question. Of course, with the number of comments received, it is possible that one or more questions have been accidentally overlooked. This is not the Department's intent, and any questions not answered within this document should be sent to Bill Tans at the following address: Bill Tans (SS/6), Department of Natural Resources, P.O. Box 7921, Madison, WI 53707. The questions and comments are written in bold type, and the Department responses follow each question in regular type. Where Wisconsin Statutes or Administrative Codes are paraphrased, the reader is advised to check the original language if more complete information is desired.

Wisconsin River Water Quality

1.

Q: The amount of mercury allowed at the Hat Rapids Dam site is currently at unacceptable or near unacceptable levels. If there is already 3 times the safe limit of mercury in the river at Hat Rapids then why would you allow any more mercury to be discharged? The discharge from Crandon will push mercury levels over the acceptable limits. Why are you suddenly looking at these levels again? Can the current levels suddenly change to facilitate the amount? How is this affecting the progress of the Crandon Mining Company (CMC) proposal?

A: The behavior and environmental effects of mercury are very complicated. Mercury is a naturally occurring element present everywhere in the environment at some level. Much of it comes from coal-burning power plants and industrial sources. Wisconsin has water quality standards for mercury for the protection of fish and aquatic life, humans, and wildlife. It is true that the measured concentration in the Wisconsin River (3.89 ng/L = 3.89 nanograms per liter = 3.89 parts per trillion) is above the standard for the protection of wildlife (1.3 ng/L).

The mercury limit is not changeable, however, in many cases, it is difficult to measure mercury at such low concentrations. If approved, the surface water discharge permit for CMC would contain requirements to measure mercury at ultra-low concentrations, and also to prevent mercury discharge above the limit of 1.3 ng/L. Although it would not necessarily be measurable in the field, calculations show that the CMC discharge, in a worst-case scenario (low river flow and the highest possible effluent flow, at 1.3 ng/L mercury) would reduce the mercury concentration in the river to 3.87 ng/L, but would increase the mercury mass in the river by 0.28%. The difference attributable to the CMC discharge would not be statistically significant.

The progress of the Crandon Mining Company (CMC) proposal is not being affected by any surface water mercury issues. While many of the mercury-related issues are complex, the Department is reviewing them and drafting appropriate documentation for inclusion in the Environmental Impact Statement (EIS). CMC is providing the information for which they are obligated, and the Department is proceeding in its review of the mercury issues. The Draft EIS (DEIS) will be published for public comment early in 1998. Please also see Responses #5 & #10 for further discussions of mercury and surface water quality standards.

2.

Q: One Department of Natural Resources (DNR) employee stated, "The Wisconsin River is improving in quality as it goes downstream." It was also stated that the dissolved oxygen is continually changing now in the river. Great measures have been taken the last 15-20 years to clean up the river, so why allow another sewer dumping into the river?

A: This statement quoted describes how organic matter, when discharged into the river, naturally decays. This is referred to as biochemical oxygen demand (BOD_5 - the $_5$ refers to the organic matter that decays in 5 days). As a result, river water downstream from point source discharges becomes "cleaner" as the natural processes occur, and BOD_5 is removed.

The Department regulates water quality in the state by establishing state water quality standards for a number of pollutants. The standards represent the maximum concentrations of these substances that the river can withstand without having adverse impacts to aquatic life, wildlife, human health, or the public interest (which includes factors such as recreational, agricultural, navigational, and industrial uses).

Comparisons with existing permitted discharges (see Appendix A) demonstrate the proposed

discharge from the Crandon Mine, if predictions are correct, would not be a significant contributor of flow or pollutants. (In fact, the treated wastewater would meet drinking water standards for most parameters.) Any new or increased discharge into waters of the state cannot be outright prohibited by the Department. The users of waters of the state, including municipalities and industry, are entitled to due process under the laws and administrative codes regulating wastewater discharges. These regulations are designed to prevent any significant lowering of water quality and to protect the use classification of the water. If a proposed discharge meets the water quality limitations, it will be permitted; if it doesn't, the discharge will be prohibited.

Theoretically, as long as the concentration of any given pollutant in a water body is below the established standard, that water body should be able to receive more of that pollutant from a discharge, as long as the standard is not exceeded. The Department typically allows a new discharger to add 1/3 of the difference between the standard and the existing concentration (the assimilative capacity). However, if the discharger can prove socio-economic need, this amount can increase to 100% of the assimilative capacity. Regardless, the pollutant concentrations should always remain below the standard required for environmental protection.

3.

Q: With the currentload of waste/wastewater on the Wisconsin River, how can any further effluent substances be tolerated? Don't assume that water quality is good in the Wisconsin River. There have been many fish consumption advisories, we should be looking to improve water quality - not degrading it.

A: The Department agrees with the statement about improving water quality, and there are currently a number of ways in which the Department is working to do so. Water quality standards and permit effluent limits are established to protect the designated uses of surface water. The Wisconsin River is designated as a Fish & Aquatic Life river, and its standards are set to protect aquatic life (warm water fishery and wildlife), recreation, and human health. Our antidegradation policy restricts new or increased discharges so they may not significantly lower water quality. Pollutant discharges that would cause violations of water quality standards will not be permitted. We continue to regulate pollutants to improve and protect water quality. Water quality standards were recently updated to reflect the Great Lakes Initiative, which is the cooperative agreement between the Great Lakes States and the U.S. Environmental Protection Agency (EPA) to assemble the most up-to-date scientific information on persistent toxic chemicals in the Great Lakes. Wisconsin applies standards based on this data to the entire state.

A new EPA and DNR initiative is the "Total Maximum Daily Load" (TMDL), which applies to impaired waters in the state, including the Upper Wisconsin River. This program will identify all sources and loads of pollutants causing impairments in a waterbody, and the controls necessary to reduce the pollutants so the waterbody complies with water quality standards and can support its designated uses. The TMDL includes consideration of BOD_5 loading, as well as other substances impairing water quality.

The BOD_5 wasteload allocation for Segment A of the Wisconsin River (between Rhinelander to just south of Tomahawk) is currently under evaluation and remodeling for dissolved oxygen. This is because the 5 mg/L (milligrams per liter) dissolved oxygen standard, necessary to maintain a healthy river, isn't always met. To help prevent the dissolved oxygen from going below the standard, permitted dischargers will be required to reduce the amount of BOD_5 they discharge. A proposed new discharger, like the Crandon Mine, may not discharge unless their effluent contains undetectable amounts of BOD_5 or they receive a part of the reduced allocation. There are also runoff sources contributing significant BOD_5 loading to the river. To prevent contaminated storm water runoff from entering rivers and lakes we have "priority watershed projects," and have issued storm water permits to industries and cites which require

pollution prevention efforts to keep pollutants out of the runoff.

The accumulation of mercury in sediment, aquatic life, wildlife, and humans is a major concern. Segment A of the Wisconsin River has fish consumption advisories due to mercury in the Rainbow Flowage, Boom Lake, Lake Alice, Lake Mohawksin, and the Spirit River Flowage. Our recent mercury strategy for regulating mercury in wastewater focuses on pollution prevention to minimize the mercury in wastewater discharges. Wastewater dischargers with a reasonable potential for mercury to be present can be subject to a very stringent effluent limit of 1.3 ng/L. However, most of the mercury found in aquatic systems is deposited from the air, mainly from rain. The mercury may originate some distance away, such as from coal fired power plants, and be carried in the atmosphere. There are mercury pollution prevention regulations in our air and waste management programs to minimize the release of mercury into the environment.

4.

Q: Was the cleaning of the Wisconsin River at the paper mill in Central Wisconsin after the present permit law or before?

A: Water quality in the Wisconsin River, and near facilities such as paper mills, has improved over the years, due in part to laws such as the Federal Clean Water Act and Wisconsin laws. The Clean Water Act become effective in 1972 and Wisconsin laws have evolved since. There are still contamination problems (especially sediments), but water quality has improved, especially for nutrients and solids, since 1972.

Water Quality Standards

5.

Q: [In setting effluent limits], how do levels [of pollutants] that cause minnows and fleas to be sensitive relate to affecting people?

A: Effluent limits are established based on literature sources on toxicity to the entire range of aquatic animal life present in Wisconsin, not just minnows and water fleas. Minnows and water fleas are sensitive species; and are used as test organisms (see Response #7).

Toxicity criteria for minnows and water fleas don't necessarily relate to toxicity criteria for humans, because there can be different toxicity concentration levels or criteria for minnows and water fleas compared to humans. There are five types of toxicity considered in establishing effluent limits: (1) acute fish and aquatic life, (2) chronic fish and aquatic life, (3) wildlife, (4) human health, and (5) human cancer. A toxic substance may have one or more criteria if there is more than one type of toxicity associated with a substance. For example, mercury has 4 different criteria because it has toxicity related to acute (830 ng/L), chronic (440 ng/L), wildlife (1.3 ng/L), and human health (1.5 ng/L). In this case the human health criteria is much more stringent than the criteria to protect fish and aquatic life. The standard for wildlife is even more stringent, so the limit used is 1.3 ng/L because that concentration is necessary to protect wildlife (in this case the most sensitive indicator) from bioaccumulating mercury to adverse amounts.

6.

Q: Like DDT, many of these concentrations build up in small animals, not harming them yet harming the animals that eat them. How will this constant increase in concentration affect higher species? Is bioaccumulation accounted for in protecting the most sensitive species [with regard to effluent limits]? If so, how?

A: Bioaccumulation of toxic substances in the food chain is an important consideration which is accounted for when we establish effluent limits. In the example above for mercury, the most stringent limit is for the protection of wildlife, so that's the criteria we use as the limit in the permit. To protect the wildlife with a fish diet, the limit is 1.3 ng/L for mercury, even though the fish and aquatic life can tolerate much higher concentrations.

7.

Q: Last year the DNR said synergism was not being addressed due to lack of data. Given ongoing research, is synergism being considered now with an eye to changing regulations?

A: Synergism is not being addressed in a direct manner. Limited data exists which accounts for the toxicity of mixtures of chemicals, but promulgating an environmental law based upon such limited data is not currently an option.

However, if the Crandon project were permitted, its treated wastewater effluent would be used in toxicity testing. Synergistic effects would be evaluated because lab organisms like minnows and water fleas would be exposed to the effluent in a laboratory setting. During these tests, called Whole Effluent Toxicity tests, the animals are watched to determine short-term and long-term effects on them from the undiluted effluent, and from various concentrations of the effluent in river water. If chemicals were reacting synergistically in a way that was harmful to aquatic life, it could be determined through these tests.

The Wisconsin River Discharge

8.

Q: I am not a chemistry major. Please explain why so much protection is considered to keep the solid tailings in a lined container yet the liquid tailings and sulfuric acid will be pumped into the waste storage basins and eventually into the Wisconsin River without protections?

A: See Appendix B, the proposed pipeline route. First, tailings from the mine would not be discharged to any lake or stream, in any form. They would be contained as noted in the question. The slurry water used to transport the tailings by pipe from the mine to the tailings impoundment would be reused as often as possible. The pipelines carrying the tailings slurry, returning slurry water, and chemicals used to process the ore would be monitored to enable rapid detection of leaks that might develop. The tailings slurry pipeline would be placed in a lined ditch. An emergency response plan would be required, to provide direction in the event of a leak or spill.

The proposed discharge to the Wisconsin River, on the other hand, would consist of treated mine drainage water. This water would be treated to specific permit limits for the Wisconsin River; the water quality standards for the Wisconsin River are nearly as high as drinking water standards. Contaminated water entering the treatment process would be adjusted so that it is very alkaline (a high pH) in order to precipitate out metallic hydroxides and metal sulfides. By filtering, most of the metals would be removed. Sulfuric acid would then be added, to neutralize some of the alkalinity. This process chemically changes

the wastewater, lowering the pH to the near neutral level needed to discharge into the Wisconsin River. During this process, the sulfuric acid would be consumed and chemically changed. No acid would be discharged.

9.

Q: What would be done if we have a three year drought as in 1987, '88, '89, and river flow drops to a very low rate? The Wisconsin River has a high and low water mark on it. You talked about low water levels [with respect to the discharge], how about high water levels and floods?

A: In a drought, the treated wastewater discharge from the proposed mine would discharge a small fraction (less than 1%) of the natural low flow in the Wisconsin River during dry periods. Also, the amount of groundwater flowing into the mine (or being intercepted before it can flow into the mine) would also be reduced during a drought period. This would tend to lessen the impact of mine dewatering on the streams in the Wolf River watershed.

The percentage of the river that would be attributable to the effluent becomes less as the river flow increases. In periods of high water, the added volume of the wastewater discharge would not be a problem, because of the high Wisconsin River flows during floods. In a flood situation, the discharge volume would be a very small fraction (less than one half of one percent) of the total flow in the river.

10.

Q: If there are 21 substances of concern [in the proposed discharge], why discharge even small amounts into the Wisconsin River?

A: Many people would agree that in an ideal society, we would find a way to live well without discharging any potentially dangerous substances to our waters. However, current laws recognize that some amount of pollution is acceptable. Our system of water quality regulation was passed by the Legislature and is implemented and enforced by the Department. It is intended to limit pollutants of concern to levels that, according to available scientific information, pose a comparatively small health risk to humans and to the health of rivers and streams. Some people would suggest that perhaps there are some flaws in this method of environmental protection. However, the fact remains that quantities of these substances are discharged into our waters every day. The amounts of these substances are limited by permit to concentrations that meet current water quality standards. Any additional amounts of these substances discharged in the treated mine wastewater would be limited so that the applicable water quality standards would continue to be met along the Wisconsin River.

Our ability to detect and quantify these substances has progressed immensely during the last two decades, such that we can detect many substances in very small concentrations. For example, in measuring many substances in water, we quantify the amount in units of substance per million units of water, typically expressed as parts per million. One part per million is equivalent to 2 1/2 ounces in a railroad tanker full of water. Another often-used measure is parts per billion. One part per billion is equivalent to 2 1/2 ounces in 1,000 tanker cars full of water. Today some pollutants, such as mercury, are measured in parts per trillion. A part per trillion is equivalent to 2 1/2 ounces of liquid in a water volume which would fill 1,000,000 tanker cars.

Although new discharges cannot be outright prohibited by the Department, our goal is to ensure, through state laws and regulations, that we keep our waters clean and maintain pollutants of concern below known levels of toxicity.

11.

Q: The DNR has been reassuring people in southern Wisconsin that the mining residue will not reach the "lower Wisconsin." Are you addressing the corollary (that the residue will stay in our area) with people in Wausau, Merrill, etc.?

A: Yes. The treated wastewater that is proposed to be discharged to the Wisconsin River south of Rhinelander would have to meet all of the stringent effluent limits in the surface water discharge permit. Effluent limits are designed to protect the most sensitive aquatic life in the river. These limits would require that the treated wastewater be very clean - nearly to drinking water standards - before discharge to the river. The chief components of the discharge wastewater would be minute quantities of a variety of metal contaminants, resulting from contact water from the underground mine, sulfates from the treatment process, and very small amounts of other substances. Only very tiny amounts would settle out, and ongoing sediment analyses are designed to quantify the amounts and composition of this sediment. Much of the small amounts of contaminants discharged in the river would be diluted by the river flow to insignificant and unmeasurable levels. In our DEIS we will fully evaluate the impacts of the discharge, including the effects of mercury, sulfates and metals throughout the river.

A wastewater treatment system, comparable to the system proposed by CMC, is in operation at the Flambeau Mine in Ladysmith. It has proven to be capable of removing contaminants below levels in the permit, and it has a very good operating record.

12.

Q: How many total years will we have to accept the mine waste from Forest County?

A: If the question is referring to the wastewater pipeline, the answer is that the mine will be discharging the treated wastewater into the Wisconsin River for the 28 years of mine operation. Following closure, the leachate collected from the tailings management area would be treated for several years or until leachate production is reduced to low levels. (Following this, the small amounts remaining would be collected on-site until there was an amount large enough to ship off-site for treatment at a licensed facility.)

However, it is wrong to think of the pipeline as discharging mine waste. The sources of the water in the pipeline would be primarily mine drainage water, which is the groundwater seepage into the mine that is contaminated by the ore and mining activities. This water would be treated to a degree high enough to meet the water quality standards of the Wisconsin River, a Fish & Wildlife designated river. "Mine waste," or tailings left over when the ore has been removed, on the other hand, would be disposed on site in Forest County in the proposed Tailings Management Area.

13.

Q: When significant 'events' occur, such as Sunday's downpour in Rhinelander, would Crandon mine's wastewater treatment facility have the ability to immediately stop discharges through the pipeline, or would there always be a 2.4 day delay in the pipeline? If we/you have to shut down the pipeline, how long will it be before the mine fills with water? What if the discharge is in violation? Would you shut the valve? Is there a valve? How long would it take to stop the discharge? Why does the discharged water have to remain in the pipe 2.4 days?

A: There would be no need to stop the discharge in the event of a downpour. This is because during high water situations, the discharge would be contributing a very small proportion of the total Wisconsin River flow (see Response #9). The exact details on the construction and operation haven't been

provided; we only have preliminary engineering plans at this time so we don't know about the presence or location of valves.

The discharge could be stopped by shutting off the pumps which pressurize the pipeline. Because the pipeline varies in elevation, all of the wastewater couldn't flow out by gravity once the pumps are stopped. The pipeline would be 38 miles in length, so the wastewater would be in the pipeline an estimated 2.4 days while it is pumped over this distance.

Water that did not meet the permit conditions would not be released into the pipeline because the treated wastewater would be tested daily before being released into the pipeline. A discharge to the pipeline wouldn't occur if effluent limits aren't met for the indicator parameters. If wastewater effluent couldn't be discharged, it could be recycled back through the treatment system, and excess volumes could be pumped into the tailings pond.

In a worst case situation the mine could be flooded, although this would be very unlikely because the treatment plant would have enough storage space for several years of operation before full capacity would be reached. The average flow of groundwater seeping into the mine is estimated to be about 700 gallons per minute. How fast the mine would fill with water would depend on the open space underground, which would vary over the duration of mining.

14.

Q: Why will the discharge not be tested (at a minimum) once a day at the point of discharge (Hat Rapids)?

A: Effluent testing would be required at periodic intervals at Hat Rapids (the point of discharge) early in the operational life of the mine, to determine whether any unexpected changes are occurring in the effluent after it leaves the treatment system. Tentatively this monitoring would be done only twice a year. If any changes are found, monitoring would be required more frequently. Any problems detected would have to be resolved. However, since the effluent would have to meet water quality standards before it can be pumped along the pipeline, there is little likelihood that it would not meet standards when it reaches the discharge point at Hat Rapids Dam. While it has not been decided what material the pipes would be made of, the likely range of choices does not include any that are known to contribute pollutants to the wastewater while in transport.

15.

Q: What method will be used to monitor the sediments deposited in Lake Alice from the slowing flow of the Wisconsin River? Does the DNR have this responsibility?

A: Deposition of contaminants in Lake Alice (and other depositional areas) is a legitimate concern. However, the wastewater treatment plant would produce a very clean, clear, effluent which would contain a very small amount of particulates. Monitoring will occur to follow any depositional trends. Baseline monitoring has already occurred and is ongoing. One important way to monitor sediments in those areas is to use devices to collect freshly deposited sediments (sediment traps). The DNR has been conducting this sediment work.

16.

Q: How can you guarantee the discharge of mercury? How much mercury would it take to contaminate Lake Alice?

A: Mercury is omnipresent - in other words, it occurs in all waters at some level. The DNR

will ensure that the company complies with all applicable regulations pertaining to mercury. The surface water discharge permit will contain provisions for the control of mercury. As you may be aware, there are advisories for the consumption of fish which have unacceptably high levels of mercury in Lake Alice, and the Upper Wisconsin River. Water quality standards are designed to protect users of surface water (fish, humans, and wildlife) from adverse effects. The company would have to comply with standards, and monitoring would occur in Lake Alice and other areas to track levels in the environment. See Response #1 for a more detailed discussion of mercury.

17.

Q: What impact would there be to Lake Alice from the discharge?

A: See Responses #15 & #16. Any wastewater permit issued would prohibit the discharge of metals or other substances in amounts that would cause toxic accumulation. Metals do have a tendency to attach to sediments, and might be carried far enough to be deposited in areas of low current, such as Lake Alice. However, because of the treatment process to remove sediment and silt, the discharge would contribute only very tiny amounts of heavy metals. Studies will be conducted to supplement existing information regarding baseline sediment and water conditions. If the proposed discharge meets the water quality limitations, it could be permitted, and if it doesn't, the discharge would be prohibited.

If a permit were issued for the Crandon Mine, the permit would require regular monitoring for pollutants that may be present in a mine discharge. Such monitoring would continue throughout the life of the permit at an appropriate frequency such as daily, weekly, or monthly, in order to monitor compliance with discharge limitations. Effluent limits would be included for those substances that require regulation if their concentrations are at a level of concern. Compliance with effluent limits would prevent the significant lowering of water quality to protect fish, aquatic life, wildlife, and humans.

18.

Q: What is the latest study on the effect of the waste on groundwater when the City of Merrill is subject to flood during spring thaw?

A: Wisconsin River water everywhere below the proposed Crandon project discharge point would have to meet surface water quality standards. During floods, surface waters may become contaminated by sewers which overflow, by pet waste, agricultural waste and pesticides, and other non-point pollutants. These are the main sources of pollution that pose a threat to groundwater quality in the event of a flood.

19.

Q: During the times in which mill process water is in the discharge water to the Wisconsin River will the amount of toxins increase significantly? How is this handled?

A: No. An increase in the amount of toxic substances isn't allowable if process water is discharged. In the event process water is pumped to the wastewater treatment system, it would receive treatment to achieve the same standards as the other wastewater, and the permit effluent discharge limits would still have to be met.

20.

Q: If there is another alternative to the pipeline, why not go that route knowing it is safer, than to even take one chance of killing everything in the environment should some type of accident occur? Knowing Exxon, if an accident did occur, they'd keep everything in litigation and businesses on the river would lose everything. To them 14 million dollars is nothing, while we are forced to go along with this.

A: Alternatives to pumping treated effluent will be examined in the EIS. Because the effluent must meet water quality standards (it would meet nearly all drinking water standards) before it could be pumped across the landscape, it would cause little, if any, harm in the event of a major leak. In case of other accidents, a new mining regulation that is still being considered would require that any mining company pay into a long-term, DNR-controlled fund. This fund would be available in perpetuity as a means to prevent a company from escaping financial liability through legal manipulations. See Response #50 for a discussion of this regulation.

21.

Q: I haven't heard anything about the tainted taste of fish. What are the chances of this happening? I also look at the Wisconsin River as a food source.

A: Taste and odor problems associated with eating fish from the Wisconsin River are usually attributable to a class of organic compounds called phenols, which usually are discharged by pulp and paper mills. Taste and odor problems with fish wouldn't be an issue with the proposed mine discharge, because the discharge would be inorganic in nature.

22.

Q: Are there any plans to require Crandon Mining to have means of adding oxygen to the Wisconsin River?

A: There is a possibility that addition of oxygen to the wastewater effluent would be necessary. This might be needed to meet a dissolved oxygen effluent limit, or to meet a no detectable level of BOD_5. Because there currently isn't a BOD_5 allocation available to the Crandon Mine, they may not discharge wastewater that could cause an oxygen demand in the Wisconsin River during the wasteload allocation period of May 1 through October 31.

BOD Reallocation

23.

Q: Understanding that BOD is not a toxin, to what levels can it affect aquatic life?

A: The substances that create BOD consume the dissolved oxygen in a stream as organic material decomposes. As BOD increases, dissolved oxygen decreases, until those fish and other aquatic organisms in the stream become stressed or begin to die. See Response #27 for a discussion of potential CMC discharge BOD levels.

24.

Q: The allotment allocation study is past due, why? Why is it being done now?

A: There are several reasons why we are proceeding at this time. Yes, the study is past due. Department staff have recommended that remodeling the dissolved oxygen in the river be done when the basin plan was revised every five years, but funding has not been available. Second, we have monitoring data which indicate dissolved oxygen has on occasion dropped below 5 mg/L upstream of the Hat Rapids Dam. The dips below 5 mg/L are brief and have not seriously affected aquatic life in the river; nonetheless, this information must be investigated and adjustments must be made to prevent low dissolved oxygen in Segment A. Third, the Crandon Mining Company has applied for a discharge to the Wisconsin River. If permitted, this would be the first new discharger on Segment A since it was first modeled. All these issues have gradually increased the relevancy of a re-allocation study and have enabled it to be funded.

25.

Q: Will the DNR ask the Rhinelander Treatment and Paper mill to have less effluent discharge?

A: As a result of the remodelling of Segment A of the Wisconsin River for the BOD_5 wasteload allocation, all the current dischargers could be subject reductions in the amount of BOD_5 they can discharge. This reduction would be required in NR 212, the administrative code regulating the BOD_5 wasteload allocation, and would be implemented in the reissuance of their wastewater discharge permits. The 5 mg/L water quality standard is occasionally not reached for dissolved oxygen, meaning that too many pollutants with BOD_5 are entering the Wisconsin River. Some of these violations may be attributed to storm water runoff and other sources, so low dissolved oxygen may not always be due to the permitted municipalities and industries. The wasteload allocation remodeling will be analyzing all the contributors of BOD_5 to determine which are most significantly affecting the river.

26.

Q: Your computer models for BOD on the Wisconsin River have failed previously, so why will they work now?

A: The computer model for BOD on the Wisconsin River has not previously failed. In fact, it has helped us maintain the dissolved oxygen levels above 5 mg/L **97%** of the time. However, the Wisconsin Administrative Code requires us to maintain 5 mg/L dissolved oxygen at all times and all places. The model which formed the basic for the discharge allocations was completed in the early 1980s. Since then, there have been many changes in the watershed that have the potential to affect BOD in the river.

To meet the dissolved oxygen standard we must learn more about the specific conditions that contribute to low dissolved oxygen in the Wisconsin River. This includes many complex, interdependent conditions such as water level, velocity, temperature, sunlight, amount of discharge from industrial and municipal facilities, amount of organic material from wetlands and bogs and surface runoff, as well as many others.

The model is a tool we use to predict water quality conditions based on the data that we have collected. The validity of the model and its use will certainly be reviewed as part of the allocation process.

27.

Q: How can you claim you won't let the river be over-allocated and over-polluted by Exxon when you already have over-polluted it with BOD?

A: The Crandon Mining Company has been informed that under our present allocation, its project will not be permitted if it contains any detectable levels of BOD. If the Crandon Mining Company were to discharge to the Wisconsin River, we would regulate the discharge under current law so that the Crandon Mining Company would not contribute to low levels of dissolved oxygen in the Wisconsin River.

We need to look into the potential reasons for the situations when dissolved oxygen has dropped below 5 mg/L. If we determine that the problem is coming from any of the industries or municipalities, we have the ability to lower their allowable discharge. If we determine the cause of low dissolved oxygen is natural events, such as wetland flushing, we will need to investigate a policy to address that type of event.

Wastewater discharge lagoons

28.

Q: Are the discharge ponds/lagoons lined?

A: Yes. The influent wastewater storage ponds and discharge holding ponds would be lined. Liners must be built in accordance with the DNR's industrial lagoon liner requirements contained in ch. NR 213, Wis. Adm. Code. The proposed composite liner would consist of (from bottom to top): (a) 12 inches of low permeable soil over compacted natural soil, (b) a flexible plastic membrane liner with a geotextile protective layer, (c) soil liner cover, and (d) riprap along the side slopes for erosion protection.

29.

Q: If the effluent in the ponds does not meet limits and cannot be discharged, what is done with it?

A: The treated wastewater would be tested before release to the pipeline. If the quality did not meet permit limits, the water would be sent back to the wastewater treatment plant. Wastewater that didn't meet permit standards would indicate a problem at the treatment plant; this would need to be resolved before any water could be discharged to the pipeline.

There would be two days of storage capacity, at maximum flow, in the wastewater lagoons. If more space were needed, water could be pumped to the Tailings Management Area (TMA) or used as make-up water in the mill.

30.

Q: How many lagoons will there be? How large are the lagoons? How long can wastewater sit in them? What danger is there to wildlife, environment, etc. with this concentrated exposed waste? What is to prevent toxic effluents in the lagoons from entering the groundwater or evaporating into the atmosphere? What about overflow due to rain or snow? What happens to the liner/pond as the freeze/thaw of the ground shifts it during the year?

A: There are 15 wastewater and stormwater runoff ponds proposed (also four tailings ponds composing the TMA, which are addressed in other questions). The size of the 4 ponds associated with the wastewater treatment system is described in Response #47. The four storm water ponds, or runoff ponds

in the mill area have been designed for a capacity to handle a 25 year, 24 hour storm, and would be approximately 200 feet by 100 feet by 6 feet deep. The tailings pipeline pond would contain a 25 year, 24 hour storm, plus two volumes of the tailings pipeline, and would be approximately 180 feet by 120 feet by 13 feet deep. In the tailings pond area, the stormwater management ponds have been designed for a capacity to handle a 100 year, 24 hour storm, and would have surface areas ranging from 6,100 to 21,400 square feet. The reclaim pond is part of the recycle system to store process water drawn from the TMA for reuse in the mill, and would be approximately 500 feet by 250 feet and 23 feet deep. [Note: the dimensions are approximate and would vary by location to fit specific sites.]

The stormwater ponds would only contain water for short periods of time after a storm so they would likely be unattractive to wildlife. None of the basins would contain contaminants in concentrations that would be toxic to wildlife. The wastewater ponds in the mill area would likely be unattractive to wildlife because of the activity occurring there. However, should wildlife use the water in these wastewater ponds intermittently, there would likely be no adverse effects due to relatively low concentrations of contaminants.

The wastewater ponds would be lined to prevent leakage. Evaporation of the water is not a concern, since there are no volatile compounds of concern that would enter the atmosphere from the wastewater treatment system. If the storm design capacity for a stormwater pond is exceeded, it would overflow into natural drainage ways. The proposed pond liners of flexible plastic should function properly under winter conditions and spring thaws, because the liner materials be too deep to freeze. The wastewater pond surfaces would freeze but the continual input and discharge of wastewater would keep the ponds from freezing to the bottom.

31.

Q: What will be done to clean up the lagoons/settling ponds after CMC leaves?

A: As part of the reclamation plan following completion of mining, CMC would have to follow certain procedures approved by the DNR. Any solids in the ponds would be removed and disposed. Berms for the ponds would be removed, the basins filled in, and the area replanted and stabilized.

Wetlands

32.

Q: What is being done to replenish the lost wetlands around the mining site?

A: There are two separate wetland regulatory authorities that apply to the Crandon Project. The first is part of Wisconsin's Mining Law. This statute requires that any mining operation must minimize its impact to wetlands. Consideration of this requirement has been key in Department review of the site design and layout.

Even with these considerations, approximately 29.5 acres of wetlands are currently proposed to be excavated or filled. The Department does not have the authority to require wetland replacement, or mitigation. Rather, that authority is held by the U.S. Army Corps of Engineers. Guidelines established by the US Environmental Protection Agency, referred to as the "404(b)(1) Guidelines," lay out the review process the Corps and applicant must follow. These requirements typically call for replacement with wetland acres as near as possible to the type and location of the loss. Often the federal agencies require ratios of replacement greater than 1 acre for 1 acre.

As part of the federal permitting process related to the proposed impacts to wetlands, CMC has

proposed a compensatory mitigation plan to meet anticipated federal permit conditions. CMC has submitted a plan to the Corps of Engineers to restore approximately 57 acres of wetland on the Shawano/Oconto County line approximately 50 miles south of the mine site. The plan details CMC's search for on- and near-site alternatives and the justification for proposing this more distant site. The plan includes the blockage of old ditches and construction of shallow scrapes on a former wetland that is now a mint/muck farm, as well as the restoration of water flow to the site, which should promote the growth of wetland vegetation. To date, DNR involvement with this proposal has been limited to consideration of Chapter 30 and 31 permit applications (permits are required for construction of low head dam features in the old ditches) and some technical review of the wetland restoration plans. The outcome of the proposed restoration cannot be a consideration for the Department's review of the mining permit.

33.

Q: The DNR is required to protect surface water flows and levels. What measures are proposed to prevent wetland water levels from dropping?

A: Wetland impacts would occur due to: direct filling and/or excavation for construction of mine facilities; construction related erosion, sedimentation, or trampling; trenching for pipelines, changes to water flow patterns in the watershed; or changes to groundwater conditions due to drawdown associated with mine operation pumping. Should significant wetland impacts from water level drops occur, the Department could require addition of water to the affected areas. This make-up water would be from one of three sources: treated mine wastewater, "clean" water intercepted before entering the mine, or from a different groundwater well. The water loss to some wetlands, such as wetlands adjacent to lakes and streams, would be mitigated if their associated lake or stream requires mitigation.

Transportation

34.

Q: How many gallons/trucks/rail cars loads of toxic chemicals for the mine process will be used and for how many years? Will we have to travel with them?

A: Of the chemical reagents listed in Crandon Mining Company's Environmental Impact Report, only five are regulated by the Wisconsin Department of Transportation and required to carry hazardous warning placards for transport on Wisconsin roadways. Most residents of Wisconsin already share our highways on a regular basis with trucks bearing these types of materials.
The following is a list of these chemical reagents, the estimated quantities and the projected monthly number of truck loads:

Product	Estimated Monthly Quantity (tons)	Physical State	Approximate Number of Truck Loads per Month	Required DOT Placard on vehicle
Sulfur Dioxide	62	Liquified Gas	3 truck or 0.5 RR cars	Poisonous Gas
Sodium Cyanide	18	Solid briquettes	1	Poison
Thiono-carbamate	4	Liquid	0.18	Flammable
Sulfuric Acid	10	Liquid	0.44	Corrosive
Sodium Hydroxide	0.3	Liquid	0.01	Corrosive

In addition, petroleum products (probably from local suppliers) would be used throughout the construction, operation, reclamation and monitoring operations of the proposed facility. Trucks transporting diesel fuel, gasoline or LP gas would be required to carry the DOT flammable placard.

The first three of the above listed chemical reagents are proposed to be used during the 28-year mill operation. The sulfuric acid and sodium hydroxide are used for water treatment processes which may continue for several years following mine closure. Other products used in the mine, mill, repair shops, and laboratories may carry various warning labels, but are not included on the list requiring DOT placards during transport.

Crandon Mining Company's preferred method of shipment of these reagents would be by truck. The actual trucking routes would be dependent upon the supplier, which has not been determined at this time. Supplies would likely come from one of the following distribution centers: Chicago, IL; St. Paul, MN; Duluth, MN; Milwaukee, WI, or Green Bay, WI. Due to economic considerations, the only hazardous reagent that might be shipped by rail is sulfur dioxide.

Compliance with permits

35.

Q: It is cheaper for companies to pay the minute fines for violating discharging statutes. So why would CMC clean up their discharges instead of just paying the fines?

A: To say that it is cheaper to pay fines than to treat discharges is not accurate. Penalties for violations of environmental regulations can vary considerably, depending on the nature of the activity. The maximum penalties for environmental programs in Wisconsin range from $5,000 to $25,000 per violation. For each of the major environmental programs, each day of a continuing violation is considered to be a separate offense, subject to a penalty. Therefore, there could be a $25,000 per day penalty for ongoing violations. In addition, continuing violations could be grounds for revocation of permits. It is the DNR's experience that companies prefer complying with their permit limitations rather than paying fines associated with non-compliance. More importantly, enforcement actions initiated by the Department together with the Attorney General's office mandate both clean-up and monetary penalties.

Exxon's record

36.

Q: Seriously, do you really believe anything Exxon says with their current record of environmental disasters?

A: Because of our comprehensive regulatory system, thorough environmental analysis and environmental monitoring requirements, we do not need to rely on what the company says. The Department's own experts and consultants must check all information submitted by CMC to see if it is accurate. If the Crandon project ultimately is approved, the state's permit and approval mechanisms, which have the force of law, will require compliance with literally hundreds of conditions specifying how the project must protect the environment. Oversight on construction, operations, environmental monitoring and reclamation would be detailed and exhaustive. We have the authority to require compliance based on sound engineering, legal and scientific principles pertaining to this project, thus reliance on trust at this stage in the regulatory review is not necessary.

Other mining projects

37.

Q: The DNR in Montana allowed the Anaconda Mining Company (who is no longer liable), to mine copper and zinc (etc.) in Butte. They said it would be safe yet the mine now contaminates 100's of miles of groundwater with sulfuric acid. How is this different?

A: Contrary to the statement in the question, mining and smelting began in the Butte area in the mid 1800s, long before there was a DNR (in Montana, the agency is the Department of Environmental Quality) or any environmental regulation at all. [Note: all of the existing major State and Federal laws protecting the environment were passed after 1968.] No government organization passed judgement on the safety of the Butte operation. In fact, Montana was not even a state at that time (Montana became a state in 1889). It was a first come, first dig, first find, first remove situation. In the early years, many hundreds of miles of mine passages were constructed in the Butte Hill by small mining operations removing gold, silver, and copper. Several small smelters in Butte processed the ore. In the early 1900's, one of the mining operations began to consolidate control under the name the Anaconda Copper Mining Company (later renamed the Anaconda Company). Once the Anaconda Company had control over the entire Butte Hill, they realized they needed a major mineral processing facility and began developing a mill and smelter operation in nearby Anaconda - again with little or no regulation. Later, open pit operations were begun in Butte in the mid 1950's, when the rich vein deposits were largely exhausted. In the late 1970's, ARCO bought the Anaconda Company in an attempt to diversify from petroleum. Due to falling metals prices and the economics of Anaconda's Butte-Anaconda operation, ARCO completely shut their operations down in the early 1980's.

Both the mining and smelting in Butte and the smelter operation in Anaconda have had major environmental consequences, primarily involving the release of metals into the air, onto the ground, and into the ground and surface waters. There are more than 30 square miles of groundwater contamination in the area of the Butte Hill and in the area of the unlined waste disposal facilities in Anaconda. There are also over 100 miles of contaminated surface waters stretching from Butte, in and through Anaconda, almost to Missoula. There are several square miles of contaminated soils due to air deposition from the smelter in Anaconda. In addition, there are many areas of exposed mining and mineral processing wastes, two large

open pits, and many hundreds of miles of open mine passages. In the early 1980s, the federal EPA placed large portions of Butte, Silver Bow Creek from Butte to Anaconda, a large portion of the Anaconda area, and the Clark Fork River from Anaconda to the Milltown Reservoir just upstream from Missoula on the Superfund list. All together, it is the spatially largest Superfund site.

Contrary to the statement made in the question, the Anaconda Company's successor company, ARCO, is being held liable by both the federal and state governments. Thus far, ARCO has spent many tens of millions of dollars in investigating the nature of the contamination and undertaking cleanup operations under the oversight of the EPA and Montana Department of Environmental Quality. The State of Montana is seeking $764,450,000 from ARCO to compensate the state for resource damage, and to implement a groundwater and stream restoration plan. The process has a long way to go before it is complete.

The proposed Crandon project has a few similarities to the Butte-Anaconda operation, but, on the whole, is markedly different. The similarities involve the fact that both operations involve the recovery of sulfide minerals, underground mining, and milling of ore. The differences begin with the type of deposit - the Crandon deposit is a volcanogenic massive sulfide while the Butte deposit is a copper-molybdenum porphyry. The Butte-Anaconda operation involved smelting of the ore/concentrate, while the Crandon project proposes to sell the concentrate on the open market. The Butte-Anaconda operation was largely developed and operated without any environmental laws or regulations. In contrast, the Crandon project would be subject to considerable environmental regulation, including waste management, wastewater treatment and discharge, groundwater withdrawal, stormwater management, protection of public rights to ground and surface waters, etc., during both the permitting process and any potential operation.

The Tailings Management Area

38.

Q: Will deep rooting vegetation be able to penetrate the barrier on the pond?

A: The Department has not yet completed its review of the proposed reclamation cap on the TMA. However, the proposed vegetation type for the TMA is a savanna, with scattered trees. Because of the depth of the cap, large trees with taproots would be the only vegetation which would have roots long enough to penetrate it. The savanna would likely be maintained with fire or mechanical means to reduce the numbers and sizes of invading trees. Herbicide application may be another alternative to kill woody species. Small trees and shrubs, however, on the surface and sideslopes, may actually be desirable because they would stabilize the soil from erosion and would draw water from the soil above the TMA.

39.

Q: How can vegetation grow on the TMA if the TMA is topped with water?

A: The only time that the tailings would be "topped with water" would be during the years of operation. Following that, the goal would be to dry out the tailings in preparation for installing a final cover layer of soils and other barriers. Vegetation would then grow on this final cover.

40.

Q: Sulfuric acid eats through metal. Why won't it eat through the plastic liner? How will the sulfuric acid in the tailings pond leachate be neutralized? To what degree?

A: Many plastic products are highly resistant to damage by acid conditions. This is why acid shipping containers and tank liners are commonly constructed of plastic materials. (For example, if you've ever purchased muriatic acid at a hardware store, you'll notice it is sold in a plastic container.) The TMA membrane liner material would be selected based on its proven ability to resist degradation from any chemical condition that may potentially exist within the facility.

In the environment, sulfuric acid (H_2SO_4), tends to dissociate completely in water, separating into H^+ and SO_4^- ions. The hydrogen ions (H^+) react with any available dissolved minerals containing hydroxyl ions (OH^-) to yield water. Upon completion of these reactions, if the free hydrogen ions and free hydroxyl ions are in balance, the solution will be neutral. If there continues to be an excess of free hydrogen ions, the solution will remain acidic and if there is an excess of free hydroxyl ions, the solution would be alkaline.

Over time, should the tailings facility ***not*** function according to design, acidity could be produced by the reaction of the sulfide minerals with oxygen in the presence of water. Were this to occur, it is more likely to happen well after facility closure. At first, any acid produced would be neutralized by the alkalinity in the process water, and the carbonate minerals naturally present in the tailings and proposed to be added during the end of operations in each tailings cell. These carbonate minerals (calcite and dolomite) would buffer the solution at a pH between about 6 and 8 until those minerals are completely reacted. Any continued production of acid would then drop the pH to between about 4 and 5, where the solution is buffered by dissolution of iron and aluminum hydroxide compounds. Following dissolution of the hydroxides, the solution may then be buffered at a pH between about 2 and 4 by aluminosilicate minerals (micas, feldspars, quartz).

This scenario is unlikely because following facility closure and reclamation, the final cover system is designed to exclude oxygen and water and thus ***prevent*** the formation of acid drainage mentioned in the previous paragraph. Once the tailings have been covered and drained, it is only by the addition of water and oxygen that acid drainage could be produced. The final cover and the waste mass would be monitored to ensure that the cover system is adequately limiting the movement of oxygen and water into the waste mass. Should problems develop, the final cover can be repaired or replaced as needed.

41.

Q: As part of potential for acid drainage, you stated that water, oxygen, and sulfides were required. If water is a catalyst for acid drainage, why would it be safe to cover the tailings area with water?

A: Water, oxygen, and sulfides **<u>together</u>** are required to produce acid drainage. Water is a very poor conductor for oxygen. Therefore, by covering the tailings with water, there is little potential for oxygen to reach the tailings. Water alone is not enough to cause acid drainage. Although water contains small amounts of dissolved oxygen, the small amount of acid produced would be neutralized by the buffering components of the tailings.

42.

Q: As in a landfill, the tailings will be left exposed to the air and rain. How long will the tailings be left exposed to oxygen and water before being covered?

A: Each tailings cell is proposed to operate for 6-10 years. During the operating period, the tailings spigot would be moved around the perimeter of each cell, continually depositing fresh tailings on the surface. Therefore, tailings would not be exposed for more than 2-3 months. Though we have not completed our analysis, it appears likely that the amount of oxidation that would occur before being covered by other tailings or before the placement of the cap would be neutralized by the alkalinity of the process water that would be added with the tailings. Following the period of operation, the tailings cells would be allowed to drain and settle for 1-3 years before the final cover is applied. During this period, the tailings would have to be covered by soil or some stabilizing material to prevent or neutralize acid production.

43.

Q: Why does Lincoln and Oneida County have to use 4 to 5 feet of clay in our landfills and CMC will use less than 1/2 inch?

A: The Lincoln County and Oneida County landfills are municipal landfills. The liner requirements for municipal solid waste landfills used to be 5 feet of compacted clay meeting certain specifications. The current requirement for municipal solid waste landfills is 4 feet of compacted clay overlain by a 60 mil high density polyethylene (HDPE) geomembrane. This will continue to be required for municipal solid waste landfills, including the Lincoln and Oneida County landfills.

The reason for the different treatment of municipal versus industrial solid waste landfill liners is that municipal solid waste landfills receive a much wider variety of solid wastes. The variety and type of wastes produces a more complex leachate mixture, with much more variable concentrations than would be produced by the Crandon Mine TMA or, for that matter, most other high volume industrial solid wastes. Furthermore, leachate produced by municipal solid waste landfills includes volatile organic chemicals and other organic materials that would be absent from the leachate produced by the CMC TMA.

A geosynthetic clay liner (GCL) is proposed for use in the liner of the TMA A GCL is a layer of swelling clay (bentonite) held in place between layers of strong plastic fabric. See Response #44 for a discussion on the effectiveness of GCLs. We anticipate more extensive use of geosynthetic clay liners (GCLs) in the future to replace the two feet of clay required in composite capping layers, whether for municipal or industrial solid waste landfills. However, landfills that are already approved to use compacted clay in a composite cap will likely continue to do so.

In our opinion, GCLs used in conjunction with geomembranes in composite liners should be suitable for containment of many high volume industrial solid wastes, including metallic mining and processing tailings. We also believe that not enough is known about the effects of the more complex municipal solid waste landfill leachates to allow the use of GCLs in liners for municipal landfills. Additionally, GCLs are difficult to use. Decisions have to be made during construction that require experience and training that owners of small, municipal landfills usually lack. Our experience is that, when new technologies are introduced, it is the owners and operators of industrial and large regional solid waste landfills that have dealt with them more successfully.

44.

Q: Has the lining system for the tailings ever been tested? If so, how effective was it?

A: Like many other industrial technologies in current use, the proposed TMA individual liner components have been tested for durability using accepted simulation methods. In addition, the individual components have each been used successfully in other waste disposal systems, although the overall combination of components in the TMA design is one that has not been used before. The processed till layer and the bentonite clay in the GCL are natural materials that have existed for thousands of years, so their properties would not be expected to change significantly in this application. The polyethylene geomembrane and polypropylene or polyesther geotextiles have expected survival lives of several centuries or more under buried conditions.

Bentonite clay, the primary component of the proposed GCL, has a very low natural permeability and has been used for containment facilities for decades. For instance, bentonite blended with natural soils has been used in Wisconsin and other states for sewage and water retention lagoons. The use of bentonite clay in the form of GCLs is a more recent development, propelled largely by manufacturing innovations and recent changes to federal law dealing with municipal solid waste landfills. Regulatory acceptance of GCLs has become widespread, due to the results of research on their properties when used as liners.

It is important to realize that once the tailings facility is closed and the original ponded water is drained, the facility cover (not the liner) would be the key to ensuring that an acid drainage problem does not develop. If there is little water percolating into the facility, there would be little water draining out of the bottom of the facility. The cover would limit access of both water and oxygen to the tailings. Without both, acid drainage cannot develop. Since the cover is near the surface and relatively accessible, it could be repaired or replaced as necessary.

Groundwater would not be able to horizontally enter the TMA because the lowest layer of the TMA, the sub-base, is at least 18 feet above the water table, and in most places is 40 feet above the water table.

Wastewater Treatment

45.

Q: The make-up water that will seep back into the mine will come into contact with the sulfides in the tailings. What will be done with this groundwater?

A: The mine would fill with groundwater if it were not pumped continuously. Some of this groundwater would be pumped before it enters the mine and would therefore be uncontaminated. This water may simply be discharged. Other water would enter the mine and be contaminated by metals or petroleum products in the mine workings. This water would be pumped to the surface and treated in the project's wastewater treatment plant. It would then be pumped to holding basins where it would be tested to ensure compliance with permit requirements. If it meets the requirements, it would be pumped to the Wisconsin River for discharge. If it doesn't meet the requirements, it would be sent back to the wastewater treatment plant. Water in the tailings, on the other hand, would consist of process water left over after the processing of the rock into ore. This water would be reclaimed for use in the mill.

46.

Q: If the discharge is not permitted because of a violation then the pit will fill with water and will have to be pumped out in large quantities. How would this affect the treatment plant and the monitoring?

A: The mine is proposed to be an underground, or shaft, mine, not an open pit. If effluent limits aren't met and the lagoons exceeded their capacity, the treated wastewater would be pumped to the TMA. In the unlikely event that the TMA could accept no more wastewater, the underground mine could be flooded with water. The amount of water treated is limited to 1,200 gallons per minute based on the proposed design capacity of the treatment system and the pumping capacity for the pipeline. If granted, the permit would also limit the effluent discharge to the same 1,200 gallons per minute. Quantities greater than this couldn't be handled, so if the mine is flooded it may take awhile to empty.

The full amount of mine inflow would develop over a period of several years as development of the underground mine progresses. During this time, when the volume of water to treat would be small, the ability of the treatment system to meet standards would be evaluated and adjusted as necessary. See also Response #47 for a discussion of storage basin size.

47.

Q: How large are the storage basins in the waste treatment area in the proposal and what protections are raised for leaks or exposure to oxygen?

A: The two influent wastewater storage ponds each have a design capacity of 6.9 million gallons, or enough to hold 4 days wastewater at a maximum flow of 1200 gallons per minute. These basins would be 544 feet by 200 feet and 23 feet deep. The two discharge holding ponds each have a design capacity of 1.73 million gallons, or enough to hold one day of effluent at a maximum flow of 1,200 gallons per minute. These basins would be 206 feet by 180 feet and 19 feet deep. A composite liner, as described in Response #28, would prevent leaks. There is no need to prevent the exposure of wastewater to oxygen. To the contrary, aeration of the wastewater is desirable.

48.

Q: You mentioned possible acid contamination by oxidation of the minerals. How will this be avoided in the wastewater piping process and in the waste treatment process?

A: Acid generation in the treatment process or in the pipeline wouldn't occur to any significant level. The acid generation process only applies to the tailings management area. Mineral concentrations in the wastewater would be extremely low so there would be little sulfide to convert to sulfuric acid. In addition, the wastewater treatment processes take place under alkaline, or high pH, conditions. In fact, a pH adjustment, probably by adding sulfuric acid, would be necessary prior to discharging in order to lower the pH to meet the water quality standard of 6.0 to 9.0.

49.

Q: Does the wastewater treatment facility remove mercury from the water being discharged? How? Surely not by just mixing with lime and settling out.

A: The influent wastewater from the mine drainage may contain mercury at around 100 ng/L (parts per trillion). The Flambeau Mine, with treatment processes identical to those proposed at the Crandon Mine and similar influent mercury levels, had two ultra low level mercury tests done with results of 0.33 ng/L and 0.35 ng/L. The lime and sulfide treatment process could remove mercury below the 1.3 ng/L limit.

Legal Issues

50.

Q: How flexible/amendable are the current EPA standards? How much manipulation can occur between now and opening of mine?

A: The EPA has no direct regulatory responsibilities in Wisconsin regarding mining. The EPA has delegated authority for regulation of the Clean Air and Clean Water Acts to the State of Wisconsin, and the Legislature has authorized the DNR to implement its provisions. Metallic mineral operations in this state are regulated by Wisconsin mine reclamation laws and administrative rules; these regulations require that any proposed metallic mineral operation be in conformance with all other environmental regulations and protect human health, safety, and welfare. The DNR's programs for the protection of air quality, surface-water, and groundwater resources, and solid waste disposal are applicable to metallic mineral prospecting and mining projects.

Wetlands are regulated slightly differently. The Wisconsin legislature recognized that metallic mineral deposits are located in areas where their extraction in the most environmentally sound manner may require a flexible approach to the necessary permitting requirements. Thus, mining projects must minimize wetland impacts, but the presence of wetlands would not necessarily result in an unpermittable project.

There are cases in which exemptions, modifications, and variances from administrative rules applicable to metallic mineral prospecting or mining operations may be permitted. This is consistent with many other administrative codes which recognize that no regulation can be written that covers the variations in all projects. These tools can only be used *if the proposed exemption, modification, or variance does not result in the violation of any federal or state environmental law or endanger public health, safety or welfare or the environment*.

Laws and rules can be changed, but the process is lengthy and requires the involvement and concurrence of the legislature. Most of the changes that have passed in recent times have been viewed as improvements that strengthen the environmental protection provided by the law or rule. We believe that this trend for tighter regulation will continue at the federal and state level in the foreseeable future.

The Department is currently considering two rule changes - one which would establish a dedicated trust fund to guarantee the availability of funds for necessary remedial actions, and the other would make mining operations subject to the state groundwater law rather than having its own groundwater protection rules. Both rules have already gone through the public hearing process and will likely be in front of the Natural Resources Board in September and October. These changes, proposed by the DNR at the request of the Legislature, are both intended to enhance the body of mining requirements in Wisconsin.

51.

Q: With all the expertise the DNR has on this permitting process, does the Department feel that the pending legislation on a 10 year moratorium of this process is necessary? DNR claims to be neutral, and unbiased, and non-political - why have you opposed the mining moratorium bill at every hearing?

A: The Department believes that the regulatory framework that has been established over the past 20 years is adequate to provide for environmentally safe mining in this state. We therefore support allowing any mining proposal to proceed through the environmental review and permitting processes and be judged on its individual merits. A moratorium on mining would not strengthen our ability to regulate mining projects. A moratorium would only delay a mining decision, and is therefore, in the Department's opinion, not needed. We have also indicated that the version of the "moratorium" bill that was passed by the Senate is simply another test that the mining companies must meet during the permitting process and would not likely accomplish a moratorium on mining.

52.

Q: Recent news releases have indicated that the compliance area around the CMC site is larger than that around a sewage treatment site, is this true? What is the reasoning behind this?

A: The Department has not yet established the compliance boundary for the proposed Crandon Project. The compliance boundary and the groundwater standards will be proposed after completion of the groundwater modeling analysis. The question is most likely referring to the recently proposed revisions to the mining rules which would impose the requirements of the state groundwater rule, Wis. Adm. Code ch. NR 140 on mining operations. Specifically, the question relates to the distance to the design management zone for different types of facilities and correctly states that the distance to the design management zone currently proposed for mining facilities (1200 feet) is much larger than that allowed for other types of facilities (150 feet).

The disparity in distances to the design management zone for different facilities could, if taken solely on its face, appear unreasonable. The greater distance proposed for mining facilities is a reflection of their substantially different approval criteria. Specifically, to gain a permit, mining permit applicants must demonstrate (using detailed and conservative groundwater modeling and site specific data and evaluation) that the proposed operation will meet all applicable groundwater quality standards. Such demonstration is not required for any other type of facilities. The greater distance does not mean that the groundwater resource is less protected at mining sites, however. Mining facilities may not cause detrimental impacts to water supplies and groundwater beyond the property owned by the facility; may only cause limited impacts, as defined by numerical groundwater standards within a specific zone on property owned by the facility; and may not cause impacts to surface water bodies which result in violation of surface water standards and criteria. These principles are the same for mining facilities as other regulated facilities in the state and serve to assure that groundwater is adequately protected around such facilities so that other users of groundwater are not adversely affected.

53.

Q: Please define the difference between public interests and public rights.

A: Often these terms are used interchangeably or together to encompass uses of navigable waters by the public. Public rights are those rights in navigable waters that are protected by the State. They have been identified in the Wisconsin Constitution as interpreted by the Legislature and the courts. Sometimes the term "public rights" is used when there is a specific list of activities that have been protected which is being discussed, such as fishing, swimming, and other recreational uses. The term "public interest" tends to be used in discussions of a more general nature regarding conflicts between private versus public uses of land and water. The term "public rights" is more appropriately applied to concerns about the effects on surface waters from the groundwater drawdown associated with the proposed Crandon mine.

54.

Q: In the town of Nashville the "Town Board" made an agreement with CMC that was contrary to the wishes of its constituency. What protections do individual citizens have in relation to "Town Boards" that do not represent its citizens in these agreements? What process could void these compacts?

A: Town government has often been referred to as one of the most pure forms of democracy. Electors vote in as leaders those whom they believe will best run the town. If they come to believe their chosen leaders are not appropriately representing their interests, they remove them from office through the electoral process. Sometimes past actions of elected officials can be reversed by newly elected officials, other times that is difficult. The Department is not in a position to know whether or not the newly elected Nashville Town Board members can void the local agreement their predecessors have signed. This issue is being litigated and the courts will decide.

55.

Q: My question pertains to the matter of inter-basin transfer of water - specifically - groundwater vs. surface water. How can they be regulated separately when we all know that they are interconnected?

A: Ground and surface waters are indeed interconnected. However, the history of regulation of waters has been to address different kinds of waters differently. The Great Lakes are regulated differently from inland lakes in this state. The dominant law in this country affecting water quality is the Clean Water Act, but that act applies to surface waters only, not groundwater. These are just a few of the many instances in which legislative bodies have determined that the public interest is best served by acknowledging differences between types of waters.

Wisconsin's statute which regulates inter-basin transfers of water does not distinguish between surface or groundwater. However, our Legislature specifically stated that no such transfer, be it of surface water or of groundwater, requires a permit from the state unless the transfer exceeds 2 million gallons per day. The Crandon Mine transfer would likely be well under the legislatively established amount for which a permit is required.

The Federal law does make a distinction between surface and groundwater, requiring approval for a transfer of surface waters but not for groundwater. The U. S. Army Corps of Engineers released its legal decision on the inter-basin transfer in mid-August, and stated that the 1986 Water Resources Development Act does not apply to the Crandon proposal. This decision is consistent with the State of Wisconsin's decision.

The DNR's review process

56.

Q: Are any of you answerable to Tommy Thompson?

A: Although the Secretary of the DNR is appointed by the Governor, this does not mean that DNR employees are "answerable to Tommy Thompson." Employees working on the Crandon Mine Project have been advised that they will be questioned at the Master Hearing under oath about how they arrived at their conclusions and whether they have been directed to act contrary to their professional judgements. Wisconsin has a long history of open government, good civil service protection for its employees, a solid "whistle blowers" law, and strong employee unions. Employees of the Department are in no danger of losing their jobs if they arrive at professional judgements contrary to the opinions of the Governor.

As in all projects, the DNR Secretary has directed that this project be reviewed in a thorough and impartial manner, with no bias for or against the project. In addition, the DNR has hired knowledgeable, independent consultants to review the information provided by CMC and its consultants. The Department is fully aware of public concerns regarding political influence in this process. We want everyone in this State to understand that our review has been, and through the end of this process will always be, based solely on the best science possible. There will be no other influences allowed to affect the permit review and development of the EIS.

57.

Q: If the general public continues to feel that this is an unwanted, unsafe proposal, will the DNR represent the public?

A: The function of the Department of Natural Resources, and of any cabinet-level agency, is to administer and enforce the laws passed by the Legislature and signed by the Governor. The DNR has been given the authority, by the Legislature, to regulate mining proposals in the state.

It is the Legislature's and Governor's role to represent the public. Any interested private citizen should participate in these types of issues by electing like-minded representatives to establish and revise the laws that regulate mining, as well as participate in the public hearing process prescribed by law for mining proposals. Public participation is an important part of the mining review process. Public participation in meetings and hearings, both at the local level and at the state level, helps to ensure that all relevant public concerns are addressed during the decision-making process.

Through public meetings and the environmental impact process we seek and use public comments on the project. However, if the proposed mine is found to meet all environmental protection standards, comply with all applicable laws, receive local zoning approval and minimize impacts to wetlands, the Department must issue a mining permit. The statutes do not allow the Department the option to deny a mining permit under such circumstances. If it is determined that the mine cannot comply with all our laws and regulations, the Department must deny the permit. Public acceptance of a proposed mine cannot be considered by the Department in reviewing a mining proposal. There is no "popular vote" built into the statutes that guide our environmental review of projects, including mining projects.

58.

Q: Has the Crandon Mining Company been cooperative during the permitting process?

A: The company has been very cooperative in its professional relationship with the Department. As regulators, we strive for an "arms-length" relationship with those we regulate in order to maintain professionalism and dedication to the environmental protection goals contained in our laws and regulations.

Cooperation can be judged in terms of conducting the necessary studies, willingness to commit time and effort to required activities, completing work on time, and implementing changes suggested by Department staff. In any project as large and complex as the Crandon project, there are bound to be differences of opinion between the Department and an applicant. However, these have been minimized and have not thus far been detrimental to our regulatory effort.

59.

Q: Who is paying for these studies and reviews? Why are expensive studies being done before <u>all</u> of the proposal's information is turned in?

A: The Crandon Mining Company must reimburse the State for Department staff time evaluating the environmental impacts of the project and for all permit review activities. CMC has already paid a $10,000 permit fee with submittal of the mining permit application and other fees required by other permit applications. In addition, CMC must pay the cost of all permit evaluations, reviews, and the preparation of the EIS (regardless of whether the project is ultimately approved or not). The DNR bills the company for these costs in two different ways. Quarterly, CMC is billed for the environmental impact statement and consultant costs. Through the end of the first quarter of 1997, CMC paid more than $611,000 for these costs. Following completion of the permit review process, CMC will be billed for all permit-related costs less any fees paid at the time of submittal. Through the end of 1996, the accumulated permitting costs were about $838,000.

Expensive studies are being conducted before all of the project proposals are completed because some of them require a long time to complete. Complex analyses sometimes must be conducted in order to evaluate effectiveness of particular designs, for example. Other studies are sequential, such as evaluating the impacts to lakes and streams, which can only be completed after we understand the complex interactions between groundwater and surface waters. Lastly, some studies are largely independent, and may be started early in the project review in order to complete them in a timely manner.

60.

Q: Why is the state spending money on this? We don't really need the minerals.

A: Please see Response #59 for a discussion of CMC's required payment of permitting and review processes. The State does not consider whether or not the minerals are "needed." This decision lies in the markets in the private domain. The responsibility of the DNR as a state agency is to assess any mining proposal received to see if it meets all of the State's environmental laws.

Monitoring

61.

Q: Is the tailings pond going to be monitored and maintained at company expense past the 40 year limit?

A: CMC is responsible for all costs of its monitoring program and for site maintenance, including after the 40 year long-term care period. Department costs associated with surveillance of the operation would be paid for out of the DNR's budget, identical to the procedures for all other public and private regulated facilities in the state.

Under the mining long-term liability law administered by the Department of Commerce, a mining company retains perpetual liability for any injury or property damage which occurs as a result of the operation. Therefore, if the project were to cause problems some time in the distant future, CMC and its parent or successor companies would be liable for the damages.

62.

Q: Who's going to pay for all this monitoring for all of these coming years?

A: CMC is responsible for all costs of their monitoring program. Department costs associated with surveillance of the operation would be paid for out of the DNR's budget, identical to the procedures for all other public and private dischargers in the State.

63.

Q: Will the DNR be actively present at the site - or will it rely on the company to provide data?

A: The DNR would rely on the company to provide regular monitoring data, and would also visit the site to perform monitoring. Due to the enormous amount of industrial and municipal monitoring that must go on throughout the state, it is impossible for the DNR to perform all the monitoring itself. The current practice in the state (as well as across the country) is for industries and municipalities to perform their own monitoring, using methods and laboratories which have been approved by the DNR. This method is supplemented by periodic split samples (in which a sample is split and the DNR takes one part to verify the results that the industry or municipality submits), scheduled and unscheduled site visits, and frequent laboratory relicensing.

In the Department's experience, it is extremely rare for a company to submit falsified information. A company has little incentive to falsify information; doing so would subject it to fines and would be grounds for revocation of the relevant permit(s).

64.

Q: How often will the DNR monitor the discharge? What will occur or what steps will be taken when the discharge is too much? It will be too late then.

A: The wastewater treatment permit would require effluent flow monitoring by CMC, which would occur at 3 locations - at the discharge from the treatment plant, at the booster pump station around the half way point near Monico, and at the point of discharge into the Hat Rapids Dam. The pipeline would be equipped with continuous flow monitoring devices. A telemetry system would send data to the plant control room for continuous monitoring. Flow values at these locations would be compared to one

another in order to monitor for leaks. Should drops in operating pressure and leaks be detected, the company would be required to stop pumping and repair the problem.

Effluent standards in any wastewater permit would include pollutant standards based on the maximum rate of flow. Any discharge water produced at the mine site in excess of that maximum rate of flow would have to be retained in holding ponds at the mine site.

Effluent samples would be taken for monitoring pollutant concentrations daily. Concentrations of some pollutants (especially those that are more toxic in high concentrations or that are likely to be close to the maximum permitted concentrations allowable to meet water quality standards) in the effluent would have to be measured daily, while other pollutants would require monitoring less frequently.

65.

Q: If the mine exceeds the limits set by the DNR and State of Wisconsin are they shutdown or are they just fined?

A: In the event that an environmental protection standard, and resultant permit limit, is violated, the degree and frequency of the violation would be evaluated to determine what DNR action is appropriate. Ranges of action include a notice of violation, an enforcement conference to discuss what action is necessary to prevent future violations, the issuance of an order with a compliance schedule to achieve compliance, and referral to the Attorney General's Office for prosecution if violations persist. In addition, the Mining Law (Ch. 293, Wis. Stat.) gives the DNR the ability to issue a stop order, requiring an immediate halting of mining, if there is an immediate and substantial threat to public health, safety, or the environment. In addition, failure to comply with an order of the Department can result in permit revocation and civil penalties. Decisions regarding the course of action on serious envirnomental issues are almost always made between the Department and the Attorney General's office.

Liability

66.

Q: Taxpayers picked up the majority of the bill for cleanup in the Valdez accident. Why/how will this be different here?

A: The comparison between the accidental oil spill in Alaska and a proposed mine in Wisconsin has very few similarities. If the mine were permitted, (a decision will likely be made late in 1999 or early in the year 2000), it probably would be the most closely examined, intensely regulated, and thoroughly monitored metallic mine ever permitted anywhere. Wisconsin law is specific in identifying the long-term responsibilities (forever) and liability (forever) for the mining company. In addition, bonding, insurance and financial requirements of mining companies further protect the taxpayers from potential costs of mining projects. There also are existing dedicated fund sources that could be used to finance mining site cleanup, should it be necessary. The anticipated mining rule change requiring a dedicated trust fund for each mining project to handle unforeseen environmental problems would add additional assurance that the taxpayers would not be financially responsible for any mining related environmental problems.

67.

Q: How much bonding will you require? Would this be enough to remove spilled mercury from the Wisconsin River and Lake Alice?

A: The size of the reclamation bond is established during the Master Hearing based on the testimony of all parties. The bond must be adequate to accomplish full reclamation of the facility, whenever that reclamation may have to occur. In addition, companies that have been granted prospecting or mining permits are held strictly liable for death or injury to persons or property in perpetuity.

There would be no accidental spills of mercury into the Wisconsin River or Lake Alice as the result of the CMC project. CMC has not proposed to collect, concentrate, store or use mercury in any form. Mercury is present as a trace element everywhere, including in this ore deposit, and would likely be present in minute quantities in the treated wastewater. However, the quantity discharged to the Wisconsin River would be tightly regulated. The vast majority of new mercury entering the Upper Wisconsin River drainage system will continue to be from atmospheric deposition and related non-point source runoff.

Property Values

68.

Q: What is this going to do to property valuation?

A: Our draft EIS will contain an analysis of impacts to property values should the project be developed. Development of an industrial facility in a woodland setting such as at the Crandon project site would change local land uses. As a result, there could be both positive and negative effects on land values close to the project site and along the main transportation corridor. Some tracts of land, such as developable land in favorable locations, may become more valuable because of their potential for more intensive uses. Other tracts, subject to noise, increased traffic, or visually affected by the project, could decrease in value, although we believe this zone would be limited to areas within one to two miles from the mine. We would not expect the values of properties along the wastewater discharge pipeline to be affected, because the pipeline would contain only treated wastewater and would not be substantively different from other municipal or industrial pipelines.

The laws and rules that apply to air quality and surface water and groundwater protection are comprehensive. Therefore, we would not expect property values to significantly decline from environmental impacts of the mine, because such impacts should be prevented by existing regulations. However, such concerns can also be addressed at the local level. The Local Agreement process is one such method; for example, the Town of Lincoln agreement provides a mechanism for compensation of property owners on Ground Hemlock Lake if property values would be lowered due to project impacts.

Emergencies

69.

Q: There are obviously many<u>ifs</u>. When one <u>if</u> does not become realized, an emergency develops. Are emergency <u>procedures</u> going to be mandated to be in place <u>before</u> operations begin? How does the DNR/State of Wisconsin hold CMC responsible for maintaining a fully trained staff to control mine waste and respond to disasters so that we do not wind up in a similar disaster-situation as was seen in Exxon's mismanagement of the Exxon-Valdez disaster?

A: Yes, both standard operating procedures and emergency procedures would be in place before a mining operation could begin. The risk assessment/contingency plan (RA/CP), submitted as part of the mining permit application, specifies what equipment and material are needed to respond to various types of spills and other failures. In order for Departmental approval of the RA/CP, an operator must maintain such equipment and materials on the site during operation.

In addition, many of the facilities have redundancies built in to add greater protection to the environment and reduce potential risks. For example, the tailings management area has a barrier system that would be constructed with natural, compacted fine-grained soils, a bentonite clay layer and a plastic membrane to minimize leakage. Another example of redundancy is that the wastewater treatment would be released first to holding ponds, where the wastewater would be sampled and then discharged only if it met standards. There also are a number of financial requirements for a mining company, including bonds, insurance, proof of financial responsibility, and a dedicated trust fund, that together would ensure the ability to pay for correcting environmental problems, should they occur.

Lastly, there are few parallels in comparing an Alaskan oil tanker spill with a proposed Wisconsin mine. It is much more instructive to evaluate the proposed mining operations and waste disposal facility, taken in the context of the Crandon area hydrological and geological setting and Wisconsin's regulatory framework, and then evaluate potential environmental impacts and hypothesize "what ifs". Our draft EIS will contain a full evaluation of potential environmental impacts and should be more completely responsive to your concerns.

Earthquakes

70.

Q: There <u>is</u> a reasonable chance of a 5.2 degree earthquake in Crandon area. Will the liner survive intact (i.e. - not allow leakage?)

A: The potential for earthquakes in the area of the project must be completely assessed in a mine review process. Based on information currently available, contrary to the statement in the question, there is only a small likelihood of a moderate earthquake (Magnitude = 4 to 6) in northern Wisconsin. Northern Wisconsin is located in an area which experiences little earthquake activity, although the New Madrid seismic zone lies to the south and the St. Lawrence Valley seismic zone lies to the east. However, several small earthquakes have been detected with epicenters in Wisconsin (the closest being several tens of miles to the east of Crandon).

Even if a moderate earthquake were to occur in the area of the proposed mine, significant ground motion would have to occur at the waste facility before the liner or final cover would be damaged. Earthquakes originating outside the immediate area would be a concern if the Crandon area experienced significant ground motion. However, seismic hazard potential maps prepared by the U.S. Geological Survey, as a part of the National Earthquake Hazard Mapping Program, indicate that northern Wisconsin does not have a significant risk of major ground motion. Small to moderate earthquakes do not normally result in significant ground motion; therefore, the liner and cover should survive without any major problems.

Refilling the mine

71.

Q: Where/how will the coarse tailings be stored before they are put back into the mine?

A: Waste rock and ore would be removed from the mine during the initial mine development. Waste rock would be placed on an open, lined, pre-production ore storage area or would be used as construction aggregate (if not potentially acid-generating). The ore would also be placed on the lined storage area until the mill is ready to begin processing. The eight acres of lined storage area would be large enough to accommodate all the potential acid-generating materials taken from the ground during mine development.

Once the mill is in production, ore would be hoisted from the mine and conveyed to a covered coarse ore storage area. From there, it would be sent into the mill on a conveyer belt. At the mill, the ore would be crushed and the valuable metals would be removed. Early in the mine's operation, all of the tailings would be sent to the TMA until a part of the mine was ready for backfilling. When backfilling is required, the fine tailings would be sent to the TMA, and the coarse tailings would be sent to a backfill preparation facility inside the mill. At this facility, some of the tailings would be mixed with cement to increase stability. From there, the backfill would be pumped directly into the mine.

72.

Q: One half of the tailings will be put into the tailings pond with filters and liners and the other half will be put back into the mine without liners. Won't this get into groundwater?

A: The potential for groundwater contamination from the mine and TMA is probably the most important issue related to this project. The Department is addressing this issue through the review of the facility plans, local hydrogeologic conditions, and through groundwater contaminant transport modeling. We have not completed this effort and therefore have not yet developed a response to this question. This will be done before we issue the DEIS.

Groundwater drawdown

73.

Q: How much groundwater per day will be required to operate the proposed mine? Where will the water supply come from for the proposed mining process?

A: The company has proposed to construct two water supply wells. The first would supply potable water to the mine/mill at an average rate of 25 gallons per minute and be located approximately 1200 feet northwest of Little Sand Lake. The second well would supply construction water at the TMA and would be used at an average rate of 114 gallons per minute during the 140-day construction season. Additional well water may be needed for surface water mitigation if mine inflow is not sufficient or cannot be used for that purpose. Any additional water needed for the mill would be taken from the mine or recycled from the TMA. During start-up, water that accumulates in the reclaim pond or mine inflow water could be used for the concentrator; therefore, large quantities of fresh water would not be needed for start-up. The Department continues to review the groundwater flow model and has not projected a potential range of mine inflows at this time. This information will be included in the DEIS along with both an estimate and a potential source of any needed mitigation water.

74.

Q: What will the effects of groundwater withdrawal be on surrounding wetlands, lakes, streams, and rivers?

A: Should the project be permitted, groundwater will be drawn down in an area surrounding the ore body to allow mining to proceed. The drawdown would be most substantial directly over the ore body and would diminish outward. The maximum depth and extent of drawdown would take several years to develop, and would eventually be in excess of 1,200 feet deep directly over the ore body. This number is not definite, because the numerical modeling which we are using to aid in the prediction of the drawdown is not yet complete. At that point it would remain relatively constant until the pumps are turned off following the completion of mining. The drawdown would extend out some distance from the ore body.

The Department will publish its predictions of the drawdown effects on area wetlands lakes, and streams in the DEIS. Public rights to surface waters, such as fishing, swimming, aesthetics, or navigation, are legally protected. Any significant impacts of the groundwater withdrawal would have to be mitigated by the company, or the project could not be permitted.

Groundwater modeling

75.

Q: Has CMC been able to correct their groundwater flow models so that they come to completion?

A: The Department has not made a determination that CMC's groundwater flow model is either "correct" or "incorrect." However, the Department has asked CMC a number of questions regarding the assumptions used in the model and the construction of the model. Many of these questions have not yet been answered by CMC. The Department will not make its predictions regarding groundwater drawdown impacts before it has a model that is agreeable to our groundwater modeling experts.

Appendix A:
COMPARISONS OF SELECTED EFFLUENT CHARACTERISTICS FROM SOURCES NEAR THE PROPOSED DISCHARGE AND THE FLAMBEAU MINE

Discharger	Effluent Volume (Million Gal/Day)
Crandon Mine (proposed)	0.664
Flambeau Mine	0.466
Tenneco Packaging	5.026
Rhinelander Paper	9.162
American Tissue	0.096
City of Rhinelander	1.333
City of Tomahawk	0.480

The flows represent average values of effluent discharged from the wastewater treatment system. The Crandon Mine flow is estimated based on groundwater modeling and geological site investigations.

COPPER Effluent Quality

Discharger	μg/L	Lbs/Day
Crandon Mine (proposed)	5.7	0.03
Flambeau Mine	11.5	0.04
Tenneco Packaging	56	2.35
Rhinelander Paper	9.7	0.74
American Tissue	2.9	0.0023
City of Rhinelander	14.6	0.16
City of Tomahawk	47.4	0.19

Background = 0.33 μg/L (micrograms per liter)
Wisconsin River at Hat Rapids Dam

LEAD Effluent Quality

Discharger	μg/L	Lbs/Day
Crandon Mine (proposed)	0.016	0.00009
Flambeau Mine	0.317	0.0012
Tenneco Packaging	9.3	0.39
Rhinelander Paper	<4	<0.30
American Tissue	<2	<0.0016
City of Rhinelander	6.5	0.072
City of Tomahawk	--	--

Background = 0.162 μg/L (micrograms per liter)

Wisconsin River at Hat Rapids Dam

ZINC Effluent Quality

Discharger	µg/L	Lbs/Day
Crandon Mine (proposed)	2.9	0.016
Flambeau Mine	38	0.15
Tenneco Packaging	420	17.6
Rhinelander Paper	<3	<0.23
American Tissue	25	0.020
City of Rhinelander	54	0.60
City of Tomahawk	46	0.18

Background = 1.2 µg/L (micrograms per liter)
Wisconsin River at Hat Rapids Dam

BOD Effluent Quality

Discharger	mg/L	Lbs/Day
Crandon Mine (proposed)[1]	5	28
Flambeau Mine[2]	N/A	N/A
Tenneco Packaging	69	2,912
Rhinelander Paper	18	1,396
American Tissue	460	370
City of Rhinelander	16	178
City of Tomahawk	15	60

Background = <3 mg/L (milligrams per liter)
Wisconsin River at Hat Rapids Dam

[1] The estimated average BOD_5 concentration is 5 mg/L. Because the Wisconsin River currently experiences some instances of dissolved oxygen levels less than the necessary 5 mg/L, CMC may not discharge any detectable amount of BOD_5 during the wasteload allocation period of May through October. The permit would limit BOD_5 to no detection during those months, unless CMC receives a wasteload allocation as part of the on-going remodelling of Segment of the Wisconsin River and revisions to ch. NR 212, Wis. Adm. Code. During November through April, the company would be limited to a concentration of 10 mg/L of BOD. This is because oxygen depletion is not as severe during the winter months as during the summer. Also refer to Response number 2 and numbers 22 through 27 for further discussion of BOD-related issues.

[2] The Flambeau Mine does not require a BOD limit in its permit, so no data is available.